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News From the Mandatory Center of Expertise and Design Center
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Rule defines when UXO is "solid waste"

by Hud Heaton, Huntsville Center CX Manager

On 12 February 1997, the Environmental Protection Agency published the final Military Munitions Rule (62 Federal Register 6621) in response to Section 107 of the Federal Facilities Compliance Act of 1992. The rule, which sets out to clarify regulations surrounding the clean up of unexploded ordnance (UXO), will become effective on 12 August 1997.

Perhaps the most salient aspect of the new rule surrounds classification of UXO. The rule identifies when conventional and chemical military munitions are considered solid waste—and, therefore, potentially hazardous waste—under the Resource Conservation and Recovery Act (RCRA).

When determining if a munition qualifies as solid waste, decision makers need to answer a number of questions, including:

- Is the item used or unused?
- What is the condition of the item?
- How did the item get there?

In general, a munition would be considered solid waste if there had been an intent to abandon or dispose of the item or if it has been declared a solid waste by an authorized military official. For most ordnance projects, a munition would be considered solid waste if it had been:

- Abandoned through disposal, burning, or detonation.
- Collected/transported for disposal.
- Buried or covered with land fill (either on or off of a range).
- Fired, landed off range, and not promptly retrieved or rendered safe.

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OE Program decentralization postponed

The decentralization of the U.S. Army Corps of Engineers Ordnance and Explosives Program has been postponed.

In a memorandum dated March 17, BRIG GEN Phillip R. Anderson, Director of Military Programs for the Corps, said that anticipated growth in the Ordnance and Explosives Program had not materialized and decentralization, therefore, was not cost effective. Anderson stated in the memo, "I have decided to postpone decentralization until such time as the value of the program increases sufficiently to warrant decentralization."

In fiscal 1995, Huntsville Center recommended decentralizing the execution of the Ordnance and Explosives Program based on an expanding workload and an increased funding profile. Original projections for funding in the Ordnance and Explosives Program anticipated strong funding over the near term, somewhere near $90 million for fiscal 1996 and $100 million for fiscal 1997. As a result, the Corps had selected two regional design centers, Sacramento District and Baltimore District, in December 1996 to perform future work. However, actual funding for fiscal 1996 only reached $53 million and this year's program will only reach about $58 million.

LT GEN Joe N. Ballard, Chief of Engineers, recognized this change in circumstances in a letter he sent in February to Congressman Bud Cramer, elected representative for the Huntsville, AL, area. In his letter, Ballard told the Congressman that the Corps no longer has plans to decentralize the ordnance program based on the current workload. He went on to state that if funding for the program increases in the future, the Corps would review its options to more efficiently use its limited resources. □

Ordnance removal action helps depot meet BRAC goals

by Bob DiMichele, Huntsville Center PAO

When an installation faces closure, there are a lot of legitimate concerns about the economic consequences of that action. Therefore, the potential reuse of the installation is often an important issue and a high priority for the local civilian community—so is the installation's environmental restoration.

At Savanna Army Depot Activity, IL, the reality of closure brought the threat of hundreds of lost jobs to the community of Savanna. The State of Illinois potentially intends to offset that loss by building a prison on a portion of the depot's land, if it is suitable for that use.

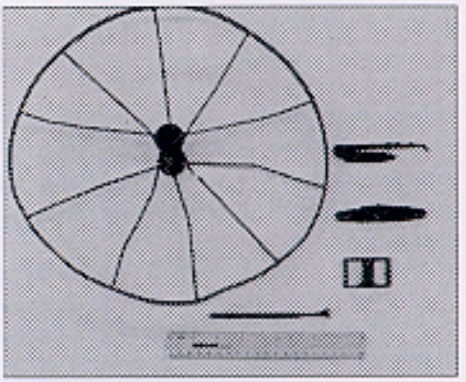
The depot has a proud 80-year history associated with ammunition testing, storage, and destruction. That history, though, caused concern when the land upon which missions were conducted must transfer out of the hands of the Department of Defense. For the Army to provide suitable acreage for a state prison, the issue of unexploded ordnance had to be addressed.

About 150 acres of rolling pasture land lie on the northeast side of the depot waiting for the prison. But, would it be safe to build on? The state required an ordnance removal action prior to accepting the property from DOD because of potential safety concerns.

Thus, safety, economic, and environmental issues all came together rapidly when Huntsville Center was called upon in April 1996 to initiate an ordnance removal action. For the depot to stay in consideration for construction of the prison, the property had to be safe, environmentally clean, and ready for a ground breaking by mid-June 1997, according to Mike Thome, the project manager. The ordnance removal, therefore, had to take place before the fall freeze, since waiting for a spring 1997 thaw would be too late, Thome said.

Fortunately, there was no documented evidence that indicated that any unexploded ordnance could be found on this portion of the depot. However, the State still required a removal action to provide the assurance that no unexploded ordnance would be found. After an 80-year history of ammunition mission, the concern was legitimate, Thome explained.

Therefore, an innovative and responsive approach was developed that balanced safety with expeditious action. An ordnance contract had to be established and an explosive safety submission had to be developed before the actual cleanup could begin. Teamwork among the Huntsville Center, the U.S. Army Industrial Operations Command, the depot's work force, the U.S. Army Technical Center for Explosives Safety (located on the depot) and the Department of Defense Explosives Safety Board allowed for an ordnance contractor to begin intrusive action by mid-August 1996.



At the Savanna Army Depot Activity BRAC site, only scrap metal was found in a response action conducted to satisfy State of Illinois safety requirements.

The effort finished in late October 1996. No ordnance was found, only scrap metal, just as experts at Huntsville Center had anticipated. That expert prediction allowed the action to proceed along a safe, but streamlined process. In fact, Thome said the project ran ahead of schedule by eight days and under budget by about 15 percent.

While the chances of recovering any unexploded ordnance from this potential prison site were slim from the start, the consequences were large. The depot will be losing jobs. The community of Savanna needs a new employer. The State of Illinois required an assurance that this potential prison property is safe to use. □

Rule *continued from page 1*

Basically, a munition would *not* be considered solid waste if it had been used for its intended purpose—that is, for training or for research, development, testing, and evaluation of weapons or weapon systems, or if recovered, collected, and destroyed on an active or inactive range during clearance activities. Generally, unused munitions and components are not considered solid waste when they are being repaired, recycled, reused, reclaimed, reconfigured, or otherwise subjected to materials recovery. There are, however, exceptions, such as buried items if the burial was not a result of intended use.

The Military Munitions Rule also defines a number of important terms, including "military munitions," "explosives, or munitions, emergency," "explosives, or munitions, emergency response," "emergency response specialist," "active military range," "inactive military range," and "unexploded ordnance." Understanding those terms is critical to understanding the scope and implications of the rule.

Rule continued on page 3

Badlands survey yields good results

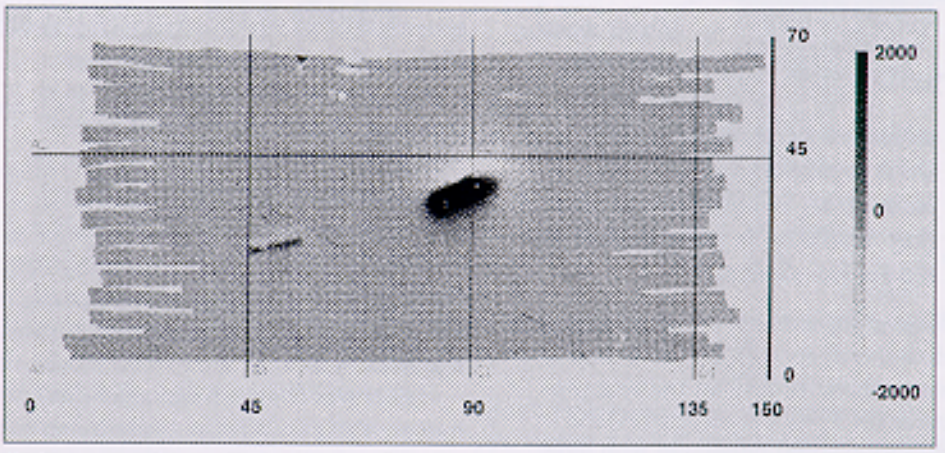
by Greg Bornhoft, Search Technologies, Inc.

Until it was closed in the early 1960's, the Badlands Bombing Range was used for air-to-surface bombing and gunnery training. When the Air Force excessed the land, surface-clearing activities yielded thousands of pounds of ordnance items. All unspent items were detonated onsite, and about 37,000 pounds of scrap and inert material were buried in four pits on the range. Since then, the land has become the wheat fields and pastures of the Pine Ridge Indian Reservation, home of the Oglala Sioux.

Under the Defense Environmental Restoration Program for Formerly Used Defense Sites, the U.S. Army Corps of Engineers, Omaha District, conducted a preliminary assessment/site investigation of the four burial pit sites. With 340,000 acres in question, Omaha sought ways to narrow and speed the survey process.

One way was to use a combined technology method developed by Search Technologies, Inc., (STI) to conduct a rapid geophysical site characterization of four square-mile sections. Somewhere out there—where there were no known reference points—were the burial pits for all that scrap material. The objective was to find them quickly and cheaply.

To help meet the mission's needs, STI deployed its Surface Towed Ordnance Locating System (STOLS) and a six-man field team to the Badlands. STOLS is a vehicular detection system, mounted with cesium vapor magnetometers, which collect geophysical data, and a global positioning system unit, which collects location data. To narrow the area for a STOLS survey, a search team assessed the likely spots for the buried scrap, and that's where the search began.



The large spot on the printout developed from data collected with STI's Surface Towed Ordnance Locating System shows one of the burial pits found at Pine Ridge Indian Reservation, which is located on the former Badlands Bombing Range. About 37,000 pounds of scrap and inert material were buried in four pits during surface-clearing years ago when the Air Force excessed the land.

After the survey, the geophysical and location data were integrated and analyzed at a mobile computer lab onsite. The result was a magnetic data map of subsurface characteristics. The survey images painted the picture and the educated speculation paid off. What was invisible to the naked eye had been captured in the magnetic concentration showing the size, depth, and location of the pit.

Within 20 minutes of downloading the data collected by STOLS, the location of the pit had been charted. The STOLS sweep covered 60 acres in 8 hours where a conventional survey with portable magnetometers is estimated to take 26 days.

Through the survey data, Omaha District was able to quickly identify the boundaries of the pit—the first step in determining if there is any ground water or soil contamination from the pit's contents. Contamination studies are now underway.

Currently with STI, Greg Bornhoft has 20 years with the Army Engineer Corps where, as an officer, he worked in ordnance removal on Grafenwoehr MI tank ranges and assessed the environmental impact of base closures for the Assistant Secretary of the Army. He also developed the sensors for the countermine program for Department of the Army Deputy Chief of Staff for Operations and Plans, Force Development. □

Rule *continued from page 2*

Further, the rule addresses the transportation and storage of waste munitions and explosives. In general, the EPA found that the Department of Defense's (DOD's) current requirement to follow Department of Defense Explosive Safety Board Standards and Department of Transportation requirements is protective of the public. Therefore, EPA granted a conditional exemption for those activities as long, as DOD continues to follow existing practices.

Also, the rule exempts from certain RCRA regulations transporters of hazardous waste across a single property. Before that exemption, a single property could be considered two sites if it were divided by a roadway—a situation that generated unnecessary paperwork.

Because the Military Munitions Rule is an amendment to RCRA, it follows current RCRA requirements. States are encouraged to adopt the rule as written, but depending on their status, states can adopt more stringent standards for some parts of the rule. To assist states, DOD formed

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UXO training soon available to civilians

by Paul W. Ihrke

Until now, only the military offered comprehensive UXO training. This fall, however, a civilian training facility is scheduled to open its doors.

Without an industry standard for unexploded ordnance (UXO) clearance or a comprehensive civilian training program, UXO work is currently done by military-trained personnel who have left the service. That pool of qualified personnel, however, may not provide enough workers to meet the future needs of Federal and international programs charged with UXO clearance. Furthermore, many of the skills taught during military training are not used in the civilian environment and many of the skills needed are not taught in the military.

Consequently, Texas Engineering Extension Service (TEEX), part of Texas A&M University System, and the Sudhakar Company, Inc., have established the International Unexploded Ordnance Training Center (IUTC). The center will provide a home for the professional development needs of the UXO industry.

The concept of the new program is multifaceted. First, the program developers plan to work with industry and government to establish a standard for UXO workers. Second, the program would provide training based on that standard. Third, the program would help satisfy the need for qualified personnel available for cleanup projects and range management by producing certified workers. Finally, the program would provide refresher training and advanced and specialty courses for veteran UXO workers.

TEEX was chosen because of the university's established, complementary programs and the availability of land and facilities to support the necessary training. TEEX has the world's largest fire-fighting training program and the nation's second largest law enforcement training program. TEEX also has environmental and occupational safety and health programs and a heavy equipment training program. Furthermore, the Riverside Campus, where the training will be conducted, has the required land to support explosives-safety, quantity-distance standards, along with ample classroom space, administrative support, and technical facilities to support the program. The Sudhakar Company, Inc., an 8a firm specializing in niche endeavors, has experience in setting up training within a university system.

Although the new UXO training will cover a great deal of material in the classroom, the strength of the program will come from hands-on training. The instructors will be Explosive Ordnance Disposal qualified and will have experience in UXO clearance operations. A six-week basic course will include the 40-hour OSHA qualification. Also, refresher training and a range management course will have high priority. Advanced courses, customized and specialty courses (technology-oriented training will be high on the list), team and individual training, and distance learning are also planned.

Priority for the training is the current work force, displaced workers, and Native American tribes. If all goes as planned, some tuition assistance will be available for students through State and Federal grants.

For information on IUTC, contact Paul Ihrke, 703-451-0931, fax 703-451-0900, e-mail ihrke@mindspring.com.

Paul Ihrke served as an Army officer for 26 years, most of which was devoted to the munitions management field. He served as Army Military Representative, Department of Defense Explosives Safety Board, and as Munitions Chief, United States Pacific Command, Camp Smith, HI. He recently retired from the service to develop IUTC and currently serves as vice president of Sudhakar Company, Inc. □

Rule *continued from page 3*

a partnering initiative last year to work on the rule and its effect on all parties. The partnering initiative has yielded a much better understanding for all stakeholders and continues to enhance the prospects of smooth implementation of the rule.

One major effect of the rule will be the potential to change the status of munitions to solid waste. Therefore, the Government must carefully review the conditions and history of ordnance at response action sites so that the correct determination can be made. To aid in consistent implementation of the Military Munitions Rule, DOD has formed a Military Munitions Rule Implementation Council, which has issued rule implementing instructions to each service. Adherence to those instructions is mandatory.

The Military Munitions Rule is an important milestone in the execution of ordnance and explosives response projects. Uniform implementation of the rule is crucial to the program, as is regulator and stakeholder involvement. As the implementation of the rule draws near, more guidance will be issued governing the how to's. Until then, if in doubt, contact my office at Huntsville Center, and we will get the right guidance for you: 205-895-1544; or heatonh@smtp.hnd.usace.army.mil. □

Looking for a perfect match: Model-based characterization fits data to UXO signatures

by Thomas Bell, AETC Inc.

Seeking to diminish the uncertainty inherent in detection instrument readings, researchers have developed a mathematical fitting procedure that identifies subsurface objects by matching magnetometer readings to calculated signatures for specific ordnance types.

Magnetometers sense distortions in the earth's magnetic field caused by buried ordnance. Unless the sensor is very close to the ordnance item, the pattern of the anomaly's magnetic field has a simple characteristic form determined by the strength and orientation of the item's magnetic dipole moment, an indicator of anomaly parameters (i.e., size, orientation, depth). The objective is to augment sensor data mathematically, thereby quickly and accurately characterizing a subsurface item.

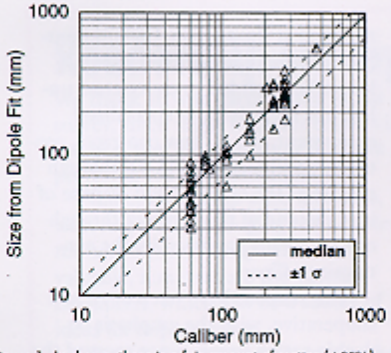

Figure 1. As shown, there is a fair amount of scatter (±25%) in the apparent sizes of identical ordnance items inferred from their respective magnetic dipole moments. Model fitting characterization seeks to more accurately predict anomaly size.

Although a useful indicator of object size, magnetic dipole moment is not precise. Figure 1 indicates a fair amount of scatter ±25%) in the apparent sizes of identical ordnance items. Such imprecision arises because the dipole moment depends not only on an object's size, but also on its shape and orientation and whether or not the object retains any permanent magnetization. For example, a 155-mm projectile creates a much stronger magnetic field anomaly when its axis is aligned with the direction of the earth's magnetic field than when it is crosswise to the earth's field. Because the dipole moment generally captures all of the information available in the magnetic field anomaly, all ordnance characterization procedures relying on magnetometer survey data are subject to such uncertainty.

To reduce the uncertainty inherent in sensor data, AETC Inc., developed a mathematical model fitting procedure. That model is embedded in a characterization process that uses a modified gradient search technique to determine the location, strength, and orientation of the magnetic dipole whose field anomaly best matches the measured data. That technique is a computationally efficient way to characterize the signal, and it accommodates all possible anomaly patterns without requiring extensive training sets. The calculations typically take less than a second on a 486 or Pentium PC. The model calculates identifying patterns, or "fingerprints," for various ordnance characteristics. The calculated fingerprints are then compared to the pattern generated by the sensor readings until a match is found. For example, the irregular contours in figure 2 show the sensor readings for a magnetic field anomaly. The smooth contours show the pattern developed by AETC's mathematical fitting procedure. For most of the contours, the sensor data and the model are the same. The model-fitted pattern is consistent with the magnetic signature of an MK 81 bomb at a depth of 1.45 meters (4.75 feet).

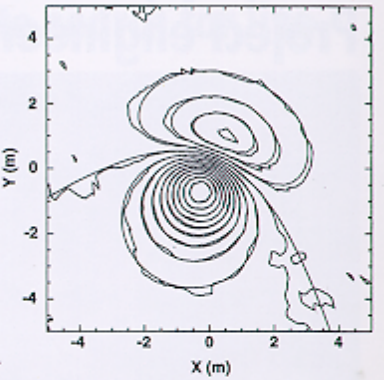

Figure 2. The irregular contours represent the magnetometer readings of an MK81 bomb at a depth of 1.45 meters; the smooth contours represent the model-based match. The match is nearly identical. Data were collected by the Naval Research Laboratory at a test field at the Marine Corps Air Ground Combat Center, Twenty-nine Palms, CA, using the Multisensor Towed Array Detection System.

The model fitting procedure produces not only an estimate of the size of the ordnance item, but also its x, y location and depth. The accuracy of the location and depth estimates are limited only by the accuracy of the recorded positions of the magnetometer readings. Under typical field conditions, position errors of several feet are not uncommon. However, recent experience with precise differential global positioning system data shows that very accurate estimates of ordnance location can be achieved. For example, in figure 2, even though the signal extends over an area more than ten feet across, the model-based fit pinpoints the (x,y) location and depth of the bomb to within five inches of its actual location and depth.

Dr. Bell is a vice president at AETC, Inc., which has developed buried UXO location and characterization software for Navy organizations. AETC processing technology was recently used to expedite buried UXO removal activity at the Idaho National Engineering Laboratory. □

Project engineer's island work benefits community

by Elsa Jimenez, Jacksonville District, Antilles PAO

Alfonso O'Neill, project engineer for the Culebra Island EE/CA, is also Emergency Operation Manager for the Antilles Office. He has worked in disaster recovery operations in Puerto Rico, the U.S. Virgin Islands, Miami, and San Francisco.

I have worked in various areas in my 19 years with the Corps, but working with DERP-FUDS projects has been both a unique and excellent experience," says Alfonso O'Neill of the Jacksonville District's Antilles Office. O'Neill was the project engineer on-site representative for the Culebra Island project. The Corps recently completed an engineering evaluation/cost analysis on Culebra Island, a former Navy target practice area.

O'Neill explained that all efforts in this project are directed to benefit the community. The Corps is examining and evaluating ways to diminish risks to the public stemming from contamination with ordnance and explosives.

"This is a very different mission and it has given me the opportunity to talk directly with local government officials and the public in order to keep them abreast of the progress of our work."

As the onsite representative, O'Neill oversaw the various contractors' work to ensure they abide by the work plans. He also performed the role of facilitator and coordinator between the contractor and the local officials. He enjoyed the interaction with various federal, municipal, and Puerto Rico government agencies also involved in the project.

When asked what has helped him more in preparing for this type of work, O'Neill quickly responds that a training course on munitions he attended in Las Vegas was very helpful, since he had no previous military experience.

He said, "The Huntsville team members are very knowledgeable and they have always been willing to meet and discuss the program in detail, answer questions, and explain the technical aspects of the work." O'Neill acknowledged that this has been extremely helpful when dealing with the community because openness promotes trust and credibility in Corps efforts.

He also had words of praise for the contractors whose work he classifies as delicate and even dangerous because they have to get close to the ordnance and explosives.

"We look forward to working together for a long time for the benefit and safety of the residents and visitors to Culebra," said O'Neill. □

Meeting of the minds: NAOC partners with Huntsville CX

by Robert Johnson, Advanced Technology Branch, Huntsville Center

When the National Association of Ordnance Contractors (NAOC) raised concerns at a Defense Science Board meeting, David Douthat, Ordnance and Explosives Director at Huntsville Center, initiated a partnering group. Concerns centered around on six main areas:

- Contractual considerations
- Personnel concerns
- Procurement matters
- Operational considerations
- Technology issues
- Safety matters

The broad goals of the group are to foster a better working relationship and understanding between Huntsville Center and the ordnance contractors and to work together as a team to improve ordnance and explosives response actions.

In the first two meetings, the group set specific goals that would address contractor concerns:

- Identification of expectations between Huntsville and ordnance contractors.
- Establishment of an active line of communication between Huntsville and the contractors that would be effective during the resolution of problems.
- Standardization in applying the Federal Acquisition Regulation through project management guidelines and periodic updates in changes to contractors.

A procedural change was also announced at the session. Government-furnished equipment (GFE) will no longer be provided to contractors unless it is high-dollar or specialized equipment. For all new contracts, contractors will manage all GFE through the life of the contract and dispose of it at the end of the contract through official means approved by the contracting officer.

The sessions have been open and cooperative, with the emphasis on doable action items. Since most of the individual issues are of mutual concern, both Huntsville and NAOC will benefit from both safer, more efficient operations and improved understanding.

Future meetings will be held at participating contractor facilities at least every three months. □

Calendar of Events

- ❑ Global Demilitarization Symposium and Exhibition: May 5-9, Reno, NV. Call Ira Click, 703-522-1820; fax 703-522-1885.
- ❑ Mines, Countermine & Demolitions Symposium and Exhibition: May 19-21, Reno, NV. Call Christy Kline or Terri Colvin, 703-522-1820, fax 703-522-1885.
- ❑ UXO Forum 1997: May 28-30, Nashville, TN. Call Tanya Lynch, 410-612-6862; fax 410-612-6836.
- ❑ Second Tri-Services Environmental Technology Workshop: June 10-12, St. Louis, MO. Call 757-865-7604; fax 757-865-8721.
- ❑ Munitions Survivability for Force XXI: October 6-8, Tampa, FL. Call 703-533-1820.
- ❑ HAZWASTE World/Superfund XVIII Remediation Conference and Exhibition: December 2-4, Washington, DC. Call 301-986-7800; fax 301-986-4538.

New Address

OE Homepage

http://www.hnd.usace.army.mil/oew/index.htm

POC Joan Burns 205-895-1766

See the Ordnance and Explosives homepage on the Internet for:

- ❑ Containment Structure Technology
- ❑ OE Policy Documents
- ❑ Business Opportunities
- ❑ OE Presentations
- ❑ OE Project Fact Sheets

Input Wanted! What would you like to see in the OE Newsletter? Below, please list any topics that you would like to see covered. We are also seeking authors for feature articles. If you'd be interested in writing an article, please indicate the topic below and give us your name, organization, and work phone. FAX this page to 205-895-1798 or call 205-895-1778.

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